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Performance of Students in the Departmental Examination in Chemistry

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ABSTRACT. Departmental examination in chemistry assesses the students' performance between the engineering and technology students and its corresponding departments. The results showed that engineering students marginally performed better than technology students and there are departments that exhibits highest mean score in the performance of both engineering and technology. It appears that students' performance has no significant difference because professors offered the same presentation of lessons, reinforcements, and evaluation whether it might be engineering or technology students. Furthermore, it showed that there is no significant difference in interdepartment performance because most of the professors were able to teach the different departments. The analyzation of this study showed that student performance in the departmental examination in chemistry depends on how the professors taught the subject.

1. INTRODUCTION

Departmental examination can be assessed to ascertain the students' level of learning within a course or a subject. The performance of engineering and technology students towards departmental examination in chemistry showed the reliability in the difference of their performance, and the probable program that can develop to further enhance their performance. This can be assessed through an examination to determine the parameters and extent of understanding and knowledge a student can utilize and apply to certain skills during the period of learning.

2. CHEMISTRY EDUCATION

Chemistry is one of the most fruitful and stimulating subject of all time, from the introduction to the dynamics of atoms to mind-blowing balancing equations makes it more fearfully exciting.

A recent large scale educational aid program for the Philippine included the retraining of secondary chemistry teachers. Teachers were introduced to new content and to alternative teaching strategies. An initial resistance to change arose as it was perceived that the new approaches did not take into account very limited school facilities and very large teaching groups. The lecturing style of teaching, which predominates at all levels throughout the country, was seen as the most effective method to handle overwhelming classroom problems. Resistance was overcome after alternative teaching styles were modelled. It contends that Asian teachers have been largely unaffected by western educational aid due in part to the fact that such aid is rarely accompanied by the modelling of introduced strategies [15].

Any meaningful study of chemistry requires learners (1) to have grasped the notion of substance; (2) to appreciate that substances maintain their identity through a change of state; (3) to recognize that during chemical changes (a) the products are different substances to the reactants, yet (b) there is a conservation of matter at a more fundamental level [20].

Correct transformation of chemical concept is a requisite for communication in chemistry and its education. In particular, translation of technical terms and expressions specialized in chemistry often faces difficulty. This is because their counterparts in chemical usages are occasionally quite different from the counterparts in common usages, thus resulting in erroneous translation. In such cases, a chemical dictionary is required for the translation software for the terms and expressions used in a chemical context. The importance and availability of such dictionary also depend on the language [12].

Chemical education reform is under way in many countries. An important reason for this reform is the growing dissatisfaction with the position of many chemistry curricula: quite isolated from students' personal interest, from current society and technology issues, and from modern chemistry. One of the efforts to abolish current curriculum isolation is the use of meaningful contexts for teaching and learning chemistry [13].

Chemistry education is a subject in the education system of the world. A particular attention to the factors effective in learning chemistry is required because of the ever-increasing development of information and knowledge concerning the chemistry and its deep relation with mathematics, physics and its vast application in the subjects related to empirical sciences and technical engineering sciences [1].

A study showed that attitude can distort the perception of information and affect the degree of their retention. Also, it affirmed that students' attitudes and interest could play a substantial role among pupils studying science, and attitude implies a favorable or disfavorable evaluative reaction towards something, events, programs, etc. exhibited in an individual's beliefs, feelings, emotions or intended behaviors. It also shows that students' positive attitudes to science correlate highly with their science achievement. Students' exposure to programmed instruction recorded higher and more favorable attitude toward mathematics. Similarly, students show more positive attitudes after being exposed to self-learning strategy [8].

2.1 Performance of Engineering and Technology Students in Departmental Examination

Students' performance in the departmental examination would show relevant effect on the students' achievement as well as it shows the students' capability to understand the fundamentals concepts and principles of the course.

Table 1. Performance of Engineering and Technology Students in Departmental Examination

	Civil	Computer	Electrical	Electronics	Instrumentation	Mechanical	Mean
Engineering	61.38	62.5	62.61	62.1	64	61.9	62.4
Technology	60.75	61.84	62	61.85	59.86	61.34	61.27
Total	61.06	62.17	62.31	61.98	61.93	61.62	61.84

The table above shows the relative performance of the engineering and technology students as well as the performance of the different department of the college of engineering and industrial technology in the departmental examination in chemistry. This shows that there is a significant variability in the performance of engineering and technology students.

The table reveals a comparative result as perceived on researches about students' academic achievement has generally taken the form of finding human or environmental variables which correlate with higher achievement and which can be used as predictors of achievement, some of which variables identified is individual differences [3].

The perceive problems on teachers preparation and development as the most significant barriers to pursuing the goals of chemistry education while problems on resources as the least significant ones [10]. Students' performance in chemistry depends on many factors and stands out to show how well a student is doing [7]. Another study revealed that there is a significant difference in student academic performance in chemistry due to their cognitive styles; students with analytic cognitive styles performed significantly higher than relational and inferential. There is a significant positive relationship between students' attitude to chemistry and their performance in chemistry [3].

2.2 Reliability of the Students' Performance

The table below shows that there is no significant difference in the performance of engineering and technology students with the results of the departmental examination in chemistry. Moreover, it reveals that there is no significant difference in the performance of all the departments under the college of engineering and industrial technology in the result of the departmental examination in chemistry.

Table 2. Significant Difference of the Students' Performance in the Departmental Examination in Chemistry

Group	Mean	df	t-value		P-value	Decision	Remarks
			computed	tabular			
Engineering	62.4	11	0.2457	4.38737	0.92747	Failed to Reject Ho	Not Significant
Technology	61.27						

The table shows the significant difference in the departmental examination in chemistry of engineering and technology students. The tabular value of 4.38737 is greater than the computed value of 0.2457, $t_{tv} = 4.38737 > t_{cv} = 0.2457$ at level of significance = 0.05, and the observed outcome is expected to be 92.747% as p-value = 0.92747 > 0.05. The probability may not appear very likely, so there is no sufficient evidence to reject the null hypothesis. This indicates that it failed to reject the null hypothesis and therefore conclude that there is no significant difference in the performance of engineering and technology students in the departmental examination in chemistry.

This coincides with a study which showed that students' performance in chemistry deals with their prior learning as a precursor to their misconceptions, it includes fundamental concepts of chemistry. Thus, it makes no significant difference in their performance because most of the professor's handling engineering students also handle technology students [16].

Reducing the incongruence between the outcomes (both cognitive and affective) of the conventional secondary chemistry curriculum and to attain the meaningful connection of students' learning to daily life and society issues. The problem is addressed by a design study by the use of several research cycles using developmental research. The researchers developed a promising understanding about an instructional framework for curriculum units that embodies a coherent "need-to-know" principle and is based on authentic practices. With this framework they were able to show other examples how a context-based chemistry curriculum can be constructed based on the developed "need-to-know" principle as it has proven [5]. Attitudes towards chemistry among the students seems to greatly influence their performance in chemistry.

2.3 Enhancement of Students' Performance in Chemistry

Common teaching approaches in chemistry tend to focus on engaging students in the description of the structure of chemical substances and the characteristics of chemical process [21]. The need to move beyond the teaching of a series of facts discuss and develop their own opinions, and critical thinking skills needed for genuine problem solving, especially important in a professional context [17].

Although we may think of chemistry as being a logical subject, many chemical concepts can't be learnt in an entirely logical manner, at least not in terms of clearly following deductively from previously accepted ideas and/or interpretation of empirical evidence [20].

Attitudes and academic achievement are indispensable in teaching science. The progress of students' positive attitudes in science as a school subject is one of the foremost responsibilities of every science teacher. Unfortunately, research has revealed that much of what goes on in science classrooms is not particularly attractive to students across all ages [19]. Another study figure out that improving students' positive attitudes to science lessons in school is significant [6]. Research has confirmed that attitudes are linked with academic achievement [22, 9, 18, 4] which shows that a correlation between attitude toward science and achievement exist. Similarly, attitudes predict behaviors as it has proven [11, 14].

Since not all students can afford to buy expensive textbooks, every school should have an adequate and functional library, manned by at least one professional librarian [2].

3. CONCLUSION

Based on the results and findings, it is shown that there is no significant difference in the performance of engineering and technology students with the result of the departmental examination in chemistry and that there is no significant difference on the departments under the college of engineering and industrial technology based on the results of the departmental examination. Moreover, it showed that engineering students marginally perform better than the technology students; there are some technology students who perform better than engineering students; And most of the professors who are teaching in the engineering blocks are also the professors who are teaching in the technology blocks; most of the professors are teaching in the different departments and therefore shows that the lessons presented such as discussions, examples, and evaluation is the same throughout other departments.

Furthermore, it proposes that professors may not entangle the concept that engineering students are different from technology students; this may be a substantial study to provide that it really doesn't matter to the students, but to the professors who are teaching the subject; provide more vivid teaching strategies to the students that can cope up with their studies; And strengthen the utilization of the syllabus and its content of its coverage during departmental examinations.

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